

REMARKS

Favorable reconsideration is respectfully requested.

The claims are 1 to 5.

The above amendment is responsive to points set forth in the Official Action.

With regard to the objection to the abstract and specification, the corrections suggested by the Examiner have been made.

With regard to the rejection of claims 1 to 5 under 35 U.S.C. 112 on the ground of indefiniteness, appropriate amendment has been made along the lines indicated by the Examiner.

Claims 1, 4 and 5 have been rejected under 35 U.S.C. 102 (b) as being anticipated by Ametani et al. (JP 2003-012796).

This rejection is respectfully traversed.

A brief discussion of the present invention will be of assistance in appreciating Applicants' reasons for traversal of the rejection.

The present invention provides a process for the production of a bifunctional phenylene ether oligomer compound having no amine adduct represented by the formula (1), which process comprises oxidatively polymerizing a bivalent phenol of the formula (2) and a monovalent phenol of the formula (3) in the presence of a mixture of a specific secondary amine with a tertiary amine (as recited in claim 1).

Further, the present invention provides a process for the production of a bifunctional phenylene ether oligomer compound, which process can stably and efficiently produce in high quality a bifunctional phenylene ether oligomer compound having no amine adduct and having small amounts of remaining unreacted phenols, wherein the above mixture of the specific secondary amine with the tertiary amine in an amount of 20 to 70% based on the total amount thereof is charged into a reactor in advance and the balance of 30 to 80% is added with the advance of the reaction (as recited in claim 2).

Ametani et al. (JP 2003-012796) discloses a bifunctional phenylene ether oligomer compound represented by the formula (1) which is obtained by oxidation polymerization of a bivalent phenol of the formula (2) and a monovalent phenol of the formula (3). Paragraph [0011]

mentions that a variety of amines including 4-dimethylaminopyridine and ethyl isopropylamine are used and di-n-butylamine is particularly preferred, as pointed out by the rejection.

Thus, paragraph [0011] mentions, owing to the use of di-n-butylamine, that homopolymerization of the monovalent phenol of the formula (3) is inhibited, it is hard to generate a high molecular weight compound and a bifunctional phenylene ether oligomer compound having a sharp molecular weight distribution can be obtained.

All of Examples 1, 2, 3, and 4 of Ametani et al. disclose examples in which di-n-butylamine was used as an amine.

On the other hand, the present invention uses a mixture of the specific secondary amine with a tertiary amine. With regard to the amine, Ametani et al. does not disclose the effects of the mixture of the above-specified amines.

Further, the present invention (claim 2) provides a process for the production of a bifunctional phenylene ether oligomer compound having small amounts of remaining unreacted phenols, wherein part of the mixture of the specific secondary amine with the tertiary amine is charged into a reactor in advance with the balance is added with the progress of the reaction. On the other hand, Ametani et al. does not disclose or suggest such process.

Claims 1 and 3 to 5 have been rejected under 35 U.S.C. 102(e) as being anticipated by Ishii et al. (U.S. 6,689,920).

This rejection is respectfully traversed.

Ishii et al. (U.S. 6,689,920) fails to disclose the presently recited mixture of a secondary amine having a secondary alkyl group, tertiary alkyl group or an aryl group with tertiary amine.

Accordingly, the rejection of claims 1 and 3 to 5 as anticipated by Ishii et al. is untenable and should be withdrawn.

A rejection under 35 U.S.C. 103 would also be untenable since Ishii et al. is only available under 35 U.S.C. 102(e) and both it and the present application were commonly assigned when the present invention was made (see 35 U.S.C. 103(c)).

Claims 2 and 3 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Ametani et al. (JP 2003-012796) as applied to claim 1 above, and further in view of Bilow (U.S. 3,669,929).

This rejection is also respectfully traversed.

The rejection states Bilow teaches adding additional catalysts to a reaction after initiation and that Ametani et al. and Bilow are combinable as they are concerned with the same field of endeavor, namely, polyphenylene polymer chemistry, at page 5, first paragraph.

The present invention also provides a process for the production of a bifunctional phenylene ether oligomer compound, wherein part of the copper-containing catalyst is charged in a reactor in advance and the balance thereof is added with the advance of the reaction (claim 3). The present invention has the effect that the amount of unreacted raw material phenols can be decreased by dividedly adding the copper-containing catalyst.

Thus, the copper-containing catalyst has sufficient catalytic activity in the initial stage of supply of the raw materials, while the catalyst activity gradually decreases with the advance of the raw material supply and the amount of unreacted raw material phenols increases. The present invention (claim 3) overcomes the above problem.

Bilow (U.S. 3,669,929) discloses that, by adding a catalyst dividedly, partial curing is carried out in the early period and the final complete curing is carried out by the catalyst to be added in the latter period. On the other hand, the reaction of the present invention is a successive reaction. The object of the divided addition is to compensate the copper-containing catalyst which is devitalized in the polymerization system. Therefore, the divided addition of the catalyst in Bilow and the divided addition of the catalyst in the present invention are different in terms of technological meaning. Thus, the divided addition of the catalyst carried out by Bilow does not teach the divided addition of the present invention.

The invention of Bilow is to obtain a thermosetting resin composition from a polyphenylene compound with a polymethylol compound as a curing agent. On the other hand, the invention of Ametani et al. is to produce a thermoplastic phenylene ether oligomer.

Therefore, the invention of Bilow and the invention of Ametani et al. do not even belong to the same technical field.

Claims 1 and 3 to 5 have been rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3, 5 and 6 of U.S. 6,689,920 in view of Mitsui et al. (U.S. 6,521,735).

Further, claim 2 has been rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. 6,689,920 in view of Mitsui et al. (U.S. 6,521,735) as applied to claim 1 above and further in view of Bilow (U.S. 3,669,929).

These rejections are respectfully traversed.

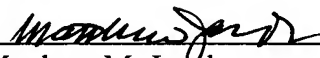
There is submitted herewith a Terminal Disclaimer which disclaims the terminal portion of any patent maturing from the present application which extends beyond the expiration date of commonly assigned U.S. 6,689,920.

No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact undersigned at the telephone number below.

Respectfully submitted,

Kenji ISHII et al.

By: 
Matthew M. Jacob
Registration No. 25,154
Attorney for Applicants

MJ/aas
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
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